

# Health Activities to Combat Flood Damage

—*Bucks County, Pa., Experience*—

By MELVINA F. PALMER, R.N., M.P.H.

**D**URING and for several weeks after the flood caused by Hurricane Diane on August 19, 1955, the Bucks County (Pa.) Department of Health served in four general ways: coordination and direction, sanitation services, antityphoid inoculations, and other medical and nursing services including health education.

The county health director, as medical coordinator of the Bucks County Civil Defense Organization, acted as the medical adviser during the declared state of emergency. He directed and coordinated the health activities of the county, working with many local groups and agencies as well as with several national disaster relief groups. He also cooperated with the regional flood headquarters of the Pennsylvania State Health Department, temporarily established at Easton.

It is difficult to convey the meaning of "directed and coordinated" health activities during such an emergency, which affected the full length of the county bordering the Delaware River and the extensive lowlands along the snakelike path of Neshaminy Creek. It meant working around the clock for days, with the barest minimum of sleep and personally reviewing the flooded areas with civil defense and United States Army engineering groups. It meant keeping constant contact with local officials and being at the receiving and calling end of the telephone and short wave radio for

information upon which to base decisions, to answer multitudinous questions, and to give directions.

It included hauling typhoid vaccine and providing tetanus antitoxin and other biologicals requested for the protection of hundreds of flood relief workers exposed to injury and negotiating for school buses to transport child evacuees from the Delaware Island camps to their homes instead of to an evacuation center as first proposed. (This same evacuation center was commandeered only a few hours later for an entire flooded town.) It meant coordinating health activities in the face of hysteria and establishing and maintaining an intramural communications system so that the staff could be quickly mobilized for work in areas of acute need. For example, there was the setting up of nursing services in the evacuation center in the high school at New Hope and the setting up and running of 2 typhoid vaccine clinics on Sunday night in 2 firehouses because of the demands of frightened people.

Demands upon the energy, tact, and technical skill exercised by the entire staff did not cease when the water subsided. Instead, the demands increased in diversity and magnitude. It was well into October before the normal activities of some phases of the health department program could be resumed.

## Sanitation

The debris laden waters of the Delaware and the Neshaminy caused widespread health hazards in the affected areas. Chief among these

---

*Miss Palmer is director of public health nursing, Bucks County Department of Health, Pennsylvania.*

---

was the contamination of basic food and water supplies. The Bucks County Department of Health prepared and distributed information on practical ways of re-establishing safe water and food supplies and of disposing of spoiled and contaminated items. The three sanitarians devoted much of their time for many weeks to testing samples from private and community wells in the flooded areas and to giving detailed

**Location of clinics, number and percentage of persons receiving one, two, or three antityphoid inoculations including those reported as being given by private physicians, Bucks County, Pa., 1955**

Clinic location	Number inoculations			Total
	1	2	3	
<i>Along Delaware River</i>				
Riegelsville <sup>1</sup> .....	972	272	994	2, 238
Upper Black Eddy.....	355	103	621	1, 079
Erwinna.....	58	42	241	341
Point Pleasant.....	72	59	185	316
Lumberville.....	117	47	178	342
New Hope.....	1, 025	293	1, 415	2, 733
Yardley <sup>2</sup> .....	1, 821	975	1, 734	4, 530
Morrisville.....	176	136	299	611
<i>Along Neshaminy Creek</i>				
Edison.....	46	45	94	185
Neshaminy <sup>1</sup> .....	391	267	686	1, 344
Lower Southampton <sup>2</sup> .....	2, 916	408	1, 344	4, 668
Hulmeville <sup>2</sup> .....	434	137	333	904
Eddington <sup>1</sup> .....	29	274	265	568
Newportville <sup>1</sup> .....	23	116	118	257
Croydon <sup>1</sup> .....	1, 016	186	221	1, 423
Physicians' offices.....	361	128	351	840
Total.....	9, 812	3, 488	9, 079	22, 379
Percentage.....	44	16	40	100

<sup>1</sup> The Bucks County Department of Health procured vaccine, provided registration cards, and assisted between and after clinics with registration and organizing of data. <sup>2</sup> The first inoculations were started by such groups as the Lady Garment Workers mobile unit, the Burholme and Trevoise rescue squads, and at Yardley, the Byberry medical staff.

instructions on decontamination. Approximately 800 samples were taken and tested by the 3 men. Technical advice was also given on the proper disposal of waste, the care of food, the disinfection of water-soaked buildings, the disposal of spoiled foods and dead animals, and insect and rodent control. An emergency courier service for daily transportation of water samples was provided by the

American Red Cross Motors Corps so that results of tests could be more quickly obtained.

**Typhoid Inoculations**

To prevent typhoid and to alleviate fear of the disease among large numbers of persons, the county health department participated in the administration and coordination of typhoid inoculations in 15 locations. A total of 44,025 inoculations were given. Only 40 percent of those receiving their first inoculations completed the series of three (see table).

The first clinics started on Sunday, August 21. Lights and sterilizers were run by emergency generators. The director, working quickly and closely with the several sources of supply, including the armed services, obtained the necessary vaccine. The syringes and needles, fortunately, were in adequate supply in the health department, having been obtained for the Bucks County cooperative Salk vaccine program. But equally important were teams of school and community nurses who assisted



Potable water is drawn from trucks located in key areas of Winsted, Conn. The Public Health Service assigned 45 technicians to stricken areas. Emergency field testing (bacteriological and chlorine residual) determined whether natural sources of water were safe or polluted.



**Flood destruction leaves in its wake silt, seepage, and possible contamination of all water supplies. The Public Health Service supplied 2,000 membrane filter packets containing equipment for testing and sterilizing well water in a New England area.**

with the typhoid inoculations. They had already established a pattern of teamwork in mass inoculations through their experience in the spring and summer with the Salk vaccine program.

Associated with the inoculation program was the unromantic task of preparing registration cards and the seemingly endless job of alphabetizing and sorting. Many volunteers and employees worked day and night to keep this important aspect of the inoculation program flowing smoothly at the 45 clinic sessions. In the county office there is a register which lists most persons who received inoculations.

#### **Health Education**

A fourth area of service provided by the county health department was the provision of public health information for residents and physicians. Four telephones, two in addition to those regularly provided, were in constant use for days. In addition, short wave radio from the civil defense office was used for sending important messages. Telephone queries related to water, sewage disposal, typhoid inoculations, as well as a multitude of health and sanitation problems. A physician, an epidemiologist from the Public Health Service, came in for a few days to help relieve profes-

sional persons in answering technical questions.

The county newspapers and commercial radio stations cooperated in the dissemination of information on the above subjects. This information (see below) was also mimeographed

and 30,000 copies were circulated in the flooded areas by Red Cross couriers, the health department staff, and civil defense workers, since few of the flood victims had regular channels of communication available to them.

## HEALTH PRECAUTIONS FOR FLOODED AREAS

issued by

### BUCKS COUNTY DEPARTMENT OF HEALTH

72 N. Main Street, Doylestown, Pa.

August 1955

*Private water supplies*—Boil all water 20 minutes before using. If you have no facilities for boiling water add  $\frac{1}{4}$  teaspoon of household Clorox (10 drops) per gallon of water. Stir vigorously, let stand for 15 minutes. Fill glass half full of this water, cover with hand, shake, and smell palm of hand. If you can smell chlorine, water is all right. If no odor, add 10 more drops and repeat process. Zonite, H.T.H., Diversol, B.K., Pittchlor, or any other common household bleach can be used. Follow directions on container. Continue to use these instructions until you know your water supply has been made safe.

*Wells*—Open-top dug wells should not be disinfected because they are always dangerous and easily subject to reinfection.

Shallow driven wells should not be disinfected since they are dangerous and subject to pollution (shallow meaning up to 30 feet in depth). If the well was tested and found unsafe prior to the flood, disinfection will be of no value. If the well was tested and found safe prior to the flood the well can be disinfected and restored to its original good condition.

*Method of disinfecting well*—Wells of ordinary size may be disinfected by the following means: Empty one-third of the contents of a 1-pound can of chloride of lime into a metal or stoneware bucket. Add a small amount of water to this and stir, thoroughly breaking up all lumps until a smooth thin paste is obtained. Add from 1 to 2 gallons

of water to this paste and stir well. Allow to settle for a couple of minutes and empty contents into the well. It is not necessary to put all of the lime settling in the bottom of the bucket into the well. Add 2 more gallons of water to the remaining lime in the bucket; stir, allow to settle, and pour into the well. It is important that the disinfecting solution mix with the water in the bottom of the well.

*Disinfecting homes, cellars*—If chloride of lime is available, it is well to wash down all walls which have been flooded with a solution of chloride of lime. Wherever possible it is also well to whitewash all walls which have been subjected to flood waters. Cellars which remain damp and any other places which might indicate need may be sprinkled with hydrated lime.

*Disinfecting home furnishings*—All clothing, bedding, and other similar materials may be disinfected with chloride of lime solution or by boiling. The chloride of lime solution will act as a bleach on colored materials. Other materials which cannot be treated without injury with chloride of lime solution should be washed with soap and water and exposed to sun and air for several hours. In disinfecting by boiling, the actual boiling time should not be less than 20 minutes. In disinfecting with the chloride of lime solution, the article should be immersed or covered with the solution of strength so that the chloride odor is noticeable and kept immersed or covered for a period of 30 minutes before washing, rinsing, and drying.

*Food for private consumption*—All foods touched by flood waters, except canned goods, and all frozen foods which have lost refrigeration should be destroyed. Canned foods which have not been damaged are usually safe for consumption, but it is important that the outside of containers be sterilized before opening by dipping or washing container in chloride of lime solution, (not too strong) and then used only after having been thoroughly cooked.

*Food for sale*—The sale of foods damaged by flood waters is regulated by the bureau of foods and chemistry of the Pennsylvania Department of Agriculture.

*To dispose of human waste*—All washed-out privies and cesspools should be filled in. To make a temporary disposal unit, dig a trench 6 feet long and 1 foot wide. Place a blind around it. After each use cover the deposit with some earth. At the end of the day sprinkle it with chloride of lime.

Cover with earth. When the trench is nearly filled, stop using it; fill with dirt, mounded, and stamp firmly.

*To dispose of garbage, spoiled food, or dead animals*—Excavate a shallow pit about 2 feet deep. Use a bulldozer, if you have one. Dump in the material to be disposed of, almost to the ground surface. Compact it as best you can. Dig another pit beside it, and use this excavation to cover the first pit. Use at least 1 foot of dirt as cover. Burying refuse is better than trying to burn it, since it will be wet and will not burn.